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[Lab. of Pharm. Physical Chemistry]

Introduction of Durable Hydrophilicity on Nylon12 by Plasma Treatment.

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We have reported the nature of Ar plasma-induced radicals of Nylon12 base on the study of electron spin resonance (ESR). The room temperature ESR spectrum of plasma-irradiated Nylon12 consisted of three kinds of spectral components. A sextet spectrum and septet spectrum were assigned to the mid-chain alkyl radical and allylic radical, respectively. A broad singlet spectrum was assigned to immobilized dangling bond sites at the surface crosslinked moiety. The Nylon12 with a durable surface wettability was prepared as follows: maleic anhydride-methylvinylether copolymer, GANTREZ, was immobilized on the surface of Nylon 12 by a plasma-induced crosslink reaction, then hydrolyzed to produce a hydrophilic carboxyl groups. The value of water contact angles of plasma-irradiated Nylon12 film treated with GANTREZ was largely decreased and remained nearly constant at the level of initially acquired wettability for a long time.

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[Lab. of Pharm. Anal. Chemistry]

A Handy Detection Cell for End-Column Electrochemical Detection in Capillary Electrophoresis.

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A handy and simple detection cell was constructed using a mixing joint for end-column electrochemical detection in capillary electrophoresis (CE). The cell allows for positioning of the working electrode at the end of the separation capillary without the aid of micropositioners. The design facilitates the exchange of electrodes and capillaries without the need to refabricate the entire capillary-electrode setup. The cell can be assembled in a short period of time. Alignment with the joint screw proved to be reproducible for working electrodes of copper and gold. The advantages of reduced time and low cost make the device very attractive for the routine analysis of electroactive species, such as carbohydrates and their derivatives, purine bases and nucleosides, amino acids, and catecholamines etc. by CE with electrochemical detection.

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[Lab. of Pharm. Anal. Chemistry]

Analysis of DNA Adducts Bases by Capillary Electrophoresis with Amperometric Detection.

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We have developed a method for the detection of DNA adducts by combining capillary electrophoresis (CE) with the specificity of amperometric detection. Guanine is the most damageable base in the four normal DNA bases and many adducts from guanine have been found in DNA. These guanine adducts are often electrochemically active, while the normal bases except guanine are not. Thus CE with amperometric detection will be one of promising methods to study DNA damage. The four normal deoxynucleosides and two damaged ones: *N*²-ethyldeoxyguanosine (*N*²-ethyl-dG) and 8-hydroxydeoxyguanosine (8-OH-dG) were separated completely by micellar electrokinetic chromatography (MEKC). Deoxyguanosine and the two damaged ones were identified with following amperometric detection. The sensitivity of our system was parallel to that of UV detection. Analysis of DNA hydrolysis products using this method was also performed briefly.

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[Lab. of Pharm. Anal. Chemistry]

Separation of *N*²-Ethyl-2'-deoxyguanosine-5'-monophosphate and Four Native Deoxyribonucleoside Monophosphates Using Capillary Electrophoresis with Polyethylene Glycol as Buffer Additive.

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Separation of five deoxyribonucleoside monophosphates: 5'-dGMP, 5'-dAMP, 5'-dCMP, 5'- dTMP and a dGMP adduct possessing *N*²-ethyl-guanine, which has been noted in relation to cancer from alcohol abuse, was investigated using capillary zone electrophoresis (CZE). The concentration of polyethylene glycol (PEG) as a modifier and the pH of running solutions can control the observed separation well. Interaction of PEG with the analytes was evaluated quantitatively and PEG would worked effectively as a hydrophobic selector in these separations. Values of *pK*_a of acidic -NH- groups in base moieties of dGMP, dTMP, and the dGMP adduct are close to that of boric acid used as buffer of running solutions and it facilitated control of their charge to improve separation of them. More sufficient and fast separation was achieved by both optimization of pH of running solutions and PEG concentration compared with those by pH alone. On-line concentration using a stacking method followed by the PEG-assisted CZE was studied briefly.